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OVERSIGHT & REGULATORY ISSUES:

IT STANDARDS FOR SUCCESSFUL OPERATION OF CREDIT BUREAU

EGYPT FINANCIAL SERVICES PROJECT
TECHNICAL REPORT #32

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DATA PAGE

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Activity:	Activities: 4.1.2: Review and assess present regulatory capability within CBE to oversee a private credit bureau 4.1.6: Assist the CBE to review and assess IT requirements
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TABLE OF CONTENTS

ACRONYMS

AI	Appraisal Institute
ABS	Asset-Backed Securities
BDA	Bond Dealers Association
CAPMAS	Central Agency for Public Mobilization and Statistics
CASE	Cairo and Alexandria Stock Exchanges
CBE	Central Bank of Egypt
CMA	Capital Market Authority
CRA	Commercial Registry Authority
CTO	Cognizant Technical Officer
EAA	Egyptian Appraisers Association
EBA	Egyptian Bankers Association
ECMA	Egyptian Capital Market Association
EFS	Egypt Financial Services Project
EHFC	Egyptian Housing Finance Company
EIMA	Egyptian Investment Management Association
EISA	Egyptian Insurance Supervisory Authority
EJA	Egyptian Judges Association
ELA	Egyptian Lawyers Association
EMBA	Egyptian Mortgage Brokers Association
ESA	Egyptian Survey Authority
EREA	Egyptian Real Estate Association
ERESA	Egyptian Real Estate Surveyors Association
GAFI	General Authority for Free Zones and Investment
GOE	Government of Egypt
IFS	International Federation of Surveyors (Egypt Chapter)
IPF	Investors Protection Fund
KRA	Key Results Area
MBA	Mortgage Bankers Association
MCDR	Misr for Clearing, Depository, and Registry
MFA	Mortgage Finance Authority
MLS	Multiple-listing Service
MSAD	Ministry of State for Administrative Development
MOF	Ministry of Finance
MOH	Ministry of Housing
MOJ	Ministry of Justice
MOI	Ministry of Investment
MOU	Memorandum of Understanding
NASD	National Association for Securities Dealers
NIB	National Investment Bank
PGF	Payment Guarantee Fund (Guarantee Fund)
PIN	Parcel Identification Number
SEC	Securities and Exchange Commission
SII	Securities and Investment Institute
UCD	Universal Cadastral Database
UNCITRAL	United Nations Commission on International Trade Law
USAID	United States Agency for International Development
YEBA	Young Egyptian Bankers Association

I. INTRODUCTION

During the assignment the consultant discussed the different aspects involved in a number of issues which are highly relevant to the successful operations of the private sector credit bureau. The consultant presented different options to the Central Bank of Egypt (CBE), which are crucial for making the private sector credit bureau successful. These options are also essential to strengthen the capacity of the CBE to license, regulate and decide on the best credit bureau model for Egypt.

A. Data Formats Used by Credit Bureaus

Over the course of several meetings with Officials of the Central Bank of Egypt, (CBE) and/or ESTELEAM, the consultant discussed different approaches and alternative choices to the business including Legal and IT Issues. This discussion was to encourage sound principles to be followed in the process of establishing a Credit Bureau in Egypt. During the meetings, the following topics were discussed and deeply analyzed to draw final conclusions:

Note: *Before arriving in Cairo, the consultant developed four different questionnaires regarding the possible data that could be obtained from banks and other institutions. When the consultant began his consultancy, it was not certain if EFS was responsible for performing the financial institutions Data Collection Task. We were able to use the responses to these questionnaires to develop an assessment of the minimum data requirements that should be obtained from Banks in order to obtain a clear picture of the capacities and readiness of Commercial Banks to transfer basic data to credit bureaus.*

All questionnaires are attached to this report. These questionnaires are:

1. **General Quick Assessment,** allowing EFS and BCE to obtain a general assessment of bank's Products and Services (Annex 1)

2. **Product Data Fields Assessment,** allowing EFS and BCE to obtain a general assessment of data fields, per product or service, that banks already have (availability) and don't have (non availability). This form is a very comprehensive questionnaire regarding vital data information that is essential for the Credit Bureau installation in Egypt (Annex 2)

3. **Product Assessment,** allowing EFS and BCE to obtain vital information on different banks products and their internal structure (as number of accounts, active and non-active accounts, overdue accounts, etc), some data analysis assessments and databases, hardware and software information (Annex 3)

4. **General Technical and Business Information,** allowing EFS and BCE to obtain information regarding Networks Infrastructure, XML Questions, and Encryption Procedures (Annex 4)

The CBE team, senior IT officers from both CBE and EFS, and the consultant, discussed all questionnaires in detail. These questionnaires are going to be merged into two (2) final electronic forms (MS Excel forms) that banks should complete. In the case where EFS performs this task, EFS and CBE Officials will prepare a final report after a statistical tabulation is performed. All data reports and information regarding bank's data, availability and readiness for the Credit Bureau operations should be completed by December 15, 2005.

B. Key Executive Positions in the Credit Bureau

ESTEALAM has agreed to provide EFS with a potential organizational chart and jobs descriptions for the future Credit Bureau for review. ESTEALAM have prepared their own already, however, we should review them and propose the necessary additions, changes and amendments to their chart(s) and jobs descriptions.

All changes and recommendations will be attached to these documents.

Despite the proposed Organizational Structure presented by ESTEALAM, we recommend the following Minimal Structural Organization, with the understanding that this process is in its very earlier stages, and by no means do the following approaches define a complete structure. The final Technical Partner selected to cooperate with ESTEALAM will suggest their own structure according to their business vision and goals. Minimum staffing and work flow between departments will follow the pattern and needs of the Technical Partner Business Structure.

All the following guidelines and information were discussed at length with the CBE Credit Bureau team.

1. **Board of Directors**

   They should be responsible for setting the guidelines of the business and general supervision of the ESTEALAM General and Administrative Staff. It is our recommendation that the Board of Directors be composed not only of executives belonging to the Commercial Banks, but from other commercial institutions, potential shareholders and Microfinance Institutions as well.

   As a general rule and for sound managerial practice, this Board of Directors should not intervene in the daily operations of the Credit Bureau, but be completely independent of the Administration of the Credit Bureau.

2. **Executive Vice-President or General Manager**

   Executive Manager responsible of the General Administration of the Credit Bureau on a daily basis.

   The candidate must have considerable experience in the industry of Credit Bureaus, sound background in business administration, finance and IT systems and technology.

3. **High Level Top Executives** (Reporting only to the Executive VP or General Manager.)

   a) Operations and Technology Chief Officer
   b) Finance and Administrative Chief Officer
   c) Business (Marketing/Sales) Chief Officer

   A brief description of their functional operations within a Credit Bureau Business

   a) Operations and Technology: Chief Officer

Executive Officer in charge of the implementation and supervision of all working areas, principles, procedures and guidelines regarding: Data Collection, Data Mapping, Data Processing, Data Dissemination and Publication.

Executive Officer in charge of the Programming Department, Communications Center, Web designing and structure, Credit Report Publications, and any additional task regarding this responsibility.

All sub-managers or sub-officers, either in the data collections department, mapping department, processing department or dissemination department, must report to this Executive Officer.

b) Finance and Administrative: Chief Officer

Executive Officer in charge of the implementation and supervision of all working areas, principles, procedures and guidelines regarding: Legal Department, Accounting Department, Corporate Finance Strategy Division, Human Resources Department, and Collections Department.

All sub-managers or sub-officers, of all these departments and internal operational structures, must report directly to this Executive Officer

c) Business (Marketing and Sales): Chief Officer

Executive Officer in charge of the implementation and supervision of all working areas, principles, procedures and guidelines regarding: The Business Planning Strategies, The Business Planning Development, Marketing Department, Sales Department, Specialized Departments devoted to Services to the Clients, Communications and Public Relations Structure.

All sub-managers or sub-officers, of all these departments and internal operational structures must report directly to this Executive Officer

4. Internal or Departmental Organization

a) Technology and Operations Division

1. **Programming Division.** Internal structure for language programming, operational software development, mapping software management, databases software management, internal process with data applications and dissemination, credit reports formats designs and operational schemes, technical development of new products, Web design, Web communications, Internet programming languages and general communications programming.

2. **Data Collection Division.** Internal structure responsible for the electronic and physical recollection the data from banks, non-banks and others enterprises as well as Judicial and Criminal courts.

   Under contractual agreements between both parties, the Bureaus should obtain monthly information regarding accounts receivables from their affiliates, in order to build up the user's or member's payment record that will lead to the establishment of the possible associated credit risk indices or ratios as well the Credit Scoring Systems..

3. **Data Mapping division.** Responsible unit of handling the data structures sent by affiliates, recollected by the Data Collection Division capable of transferring and transforming them into the Credit Bureau's internal data structure. This Unit should be build upon conversion systems that allows the processing of multiple formats coming from the affiliates' different information systems.

   The Credit Bureau should provide affiliates with the necessary structures and field widths, allowing the highest versatility in the information processing and dissemination.

4. **Data Processing Division**. Responsible unit to process all the Data received from the clients, within the internal structure of the operational software that controls this process. This is a very complex unit, based on its hardware and software capacity and capability, and is typically composed of multiple and independent servers performing the Front and Back Office operations.

5. **Data Dissemination and Publication.** This Unit is basically a complement to the previous aforementioned division, with its main responsibility being to publish all the data related to a unique consumer in the final form of a credit report.

b) Finance and Administrative Chief Officer

1. **Legal Department.** This Unit is responsible for the design, implementation and supervision of all contracts between the Credit Bureau, according to Egyptian Laws, and their Clients (including data providers and Credit Bureau users).

   This Unit is also responsible for the handling of client complaints within the Credit Bureau operations, as well the handling any possible legal demands against the Credit Bureau and/or its chief officers.

2. **Corporate Finance Strategy Division.** This Unit is responsible for the designing and implementing all policies and procedures regarding the Corporate Finance Administration, relative to the Banks and the use of credit, Cash Flow Management, Financial Projections and any other area related to the financial administrations of the company.

3. **Accounting Department.** Unit responsible for the daily operations of the company, Accounting Systems, and Accounting Operations according to the best accounting principles internationally and locally accepted within Egyptian law. This also includes Daily Income and Expense reports, Cash Flow reports, and monthly and annual Financial Statements.

4. **Human Resources Department.** Unit responsible for recruiting, hiring, supervising, and training all personnel working within the credit bureau. This selection of personnel will be performed with the highest standards for the Credit Bureau and according to the Egyptian Laws.

   It is important to emphasize that a Credit Bureau is a business based on trust. With a continuous flow of sensitive information within the Bureau, additional measures to hire and maintain personnel with moral qualities should be taken and made a priority.

5. **Collections Department.** Basically, all operations of the Credit Bureau are established and managed on a credit basis, usually no more than 30 days. The Collections unit will be responsible for all payments made. Calling the costumers, retrieving the checks, and transferring them to the credit bureau's banks account is a primarily operation of this division.

   Also, this unit is responsible for the collection, either by electronic means or by checks, of all bank's operation with the Bureau.

c) Business (Marketing and Sales) Chief Officer

1. **Business Planning, Strategies & Development Division.** This division is responsible for all Business Planning, Strategies, and Guidelines according to the Vision and Mission of the Credit Bureau.

2. **Marketing Department.** Unit responsible for executing guidelines previously mentioned, and converting them into a functional marketing plan.

   This unit is also responsible for new product development, sales structures, communicating with their clients and the public, establishing branches nationwide, structuring the services to the Clients Department, working in a very close relationship with Operations and Technology to render the services of connecting and training the new users of the credit bureau.

3. **Sales Department.** Unit responsible for executing the goals demanded in the marketing plan, hiring and training sales executives, and assigning those sales executives to specific work zones across Egypt. The number of sales representatives will be dependent upon of the final business vision of the credit bureau.

   The efficiency of a Credit Bureau in their day-to-day labor, as well as their profitability as a business, is in direct relation to the number of clients they possess, their continuous growth in numbers, the amount and quality of information they offer, and the monthly volume of reports they can provide.

   A National Sales Plan (nationwide) must be developed and in place by the initiation of the bureau operations. In Egypt, there are thousands of companies who should be visited by the Bureau Sales Team in order to offer them the Bureau's services.

4. **Clients Services Department.** Unit responsible to fulfill all client requests, demands, and complaints. This is a highly critical division.

   We recommend the establishment of a least four different internal structures for this department; 1) a division for walk-in clients who utilize bureau's general offices or branches, 2) a division only for Bank's Services. (This is due to their large volume of operations, needs, and complaints); 3) a division only for insurance companies. (This is due to the complex structure of business); and 4) a division to provide support to non-financial costumers.

The Clients Services Department should be able to provide support onsite and by telephone. Onsite service requests should be responded to in less than one hour.

5. **Communications and Public Relations Division.** Unit responsible for all communication within the internal clients (employees), outside consumer (credit bureaus clients), media, and public**.**

   This unit is also responsible for the Marketing and Communications Strategies Development, Media Campaigns and for the relationship with the Media Producer and Media Advertising Agencies.

C. High-Level IT System Requirements of the Credit Bureau

An initial checklist of vital technological issues regarding hardware, software, database platforms, processing systems and standards, communication issues and other important IT components, has been prepared. The checklist was discussed with a senior IT officer from CBE in order to prepare a final document to use in the evaluation and licensing any new credit bureau intending to operate in Egypt.

D. Consumer Protection Issue

In meetings with the CBE and Legal Arabs Consulting firm's teams, we reviewed each Rules and Regulations article and proposed several changes and amendments within these Rules and Regulations.

We also performed an overview of the Consumer Protection Rights within these Rules and Regulations, which, according to our understanding and International Best Practices, they are sound and well established.

The Credit Bureaus should incorporate these rules and procedures in their Client Services Department and Legal Division for implementation. A complete booklet should be distributed by the Bureau to its consumers and clients.

These changes will be incorporated in the final draft that will be ready by the end of October 2005 and approved by the Board of Directors of the Central Bank of Egypt no later than the end of November 2005.

E. Ensuring accuracy to minimize consumer complaints

This Task is a specific role within the Credit Bureau operations systems and technology.

The accuracy of the information provided to the Credit Bureaus (from Banks and Non-Banks Institutions), and the Credit Bureau's capacity to transform and transfer them into a Credit Report, are vital to obtain this accuracy.

During the course of our meetings with CEB, we suggested that CBE obtain official old and new ID documents, passports and any other official information that allows the credit bureaus the most advanced identification procedures. This will help protect the credit bureaus avoid claims and legal action from consumers challenging incorrect information in their credit reports.

In other words, all activities that will minimize mistaken identity and identity theft are welcome and desirable. CBE authorities should review what can be done to improve the ability to uniquely identify individuals in the system. Consumers should benefit from the adoption of a unique nationwide individual identification system as it is in Egypt. In addition, relevant authorities must make sure that credit providers reporting to the credit bureaus take greater responsibility for collecting and reporting accurate, complete and properly formatted information in order to avoid any "guess work" when compiling a credit history.

For that reason, is also extremely essential to stress again the importance of receiving from the Data Providers information such as telephone numbers, addresses, consumer ID's, etc., in order to establish a Unique Frequency Candidate within the Credit Bureau.

The mechanisms for the handling of the disputes between credit bureau and information providers and/or users are clearly defined in the Rules and Regulation from CBE concerning the Credit Bureaus operations.

An Additional Note: Accuracy Incentives

Using the U.S. Fair Credit Reporting Act as a model, CBE can promote accuracy in credit reporting primarily through four provisions.

First, the Act requires credit bureaus to follow "reasonable procedures to assure maximum possible accuracy" of the information in their credit reports.

Second, it requires credit bureaus to provide consumers with a copy of their report, and a list of those who had requested or received those reports in the previous six months, upon request. Bureaus are also required to provide "trained personnel to explain to the consumer any information furnished to him." Bureaus are permitted to impose a "reasonable charge" for access in most cases.

Third, users of credit reports who denied credit, insurance, or employment, or imposed a higher charge for credit or insurance, because of information contained in a credit report, must inform the consumer of this fact and supply the consumer with the name and address of the credit bureau that supplies the report. If the consumer contacts the credit bureau within 30 days after receiving the "adverse action" notice, the FCRA provides that the bureau must supply the consumer with a free copy of his or her credit report.

Fourth, the law requires credit bureaus to implement a dispute resolution process to investigate and correct errors. Bureaus are to delete any disputed data that they could not verify within a "reasonable period of time." If the bureau determines that the information is accurate, but the consumer disagrees, the law requires the bureau to include a statement from the consumer of not more than 100 words, or a summary of that statement, with future credit reports that contain the disputed data. In either case, the bureau must notify the consumer "clearly and conspicuously" that the consumer may direct that the bureau to inform persons who received the report during the past six months that the data has been deleted or disputed.

Taken together, these four provisions are intended to make the credit reporting system more transparent and to empower consumers to help make their own credit reports more accurate.

F. Scope of Regulation

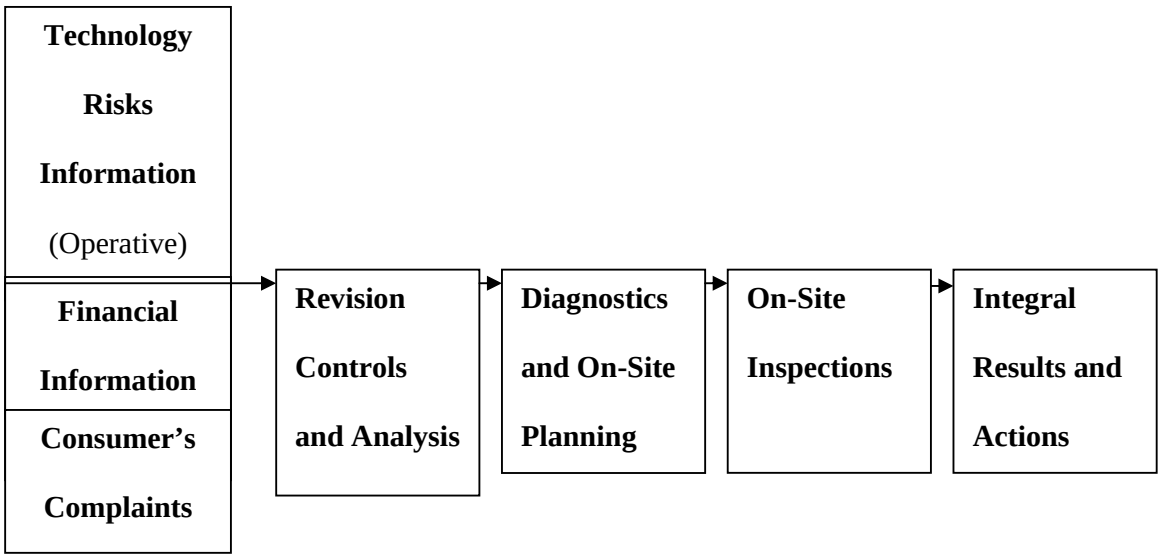
In conforming with the System of Supervision adopted by the Central Bank of Egypt, based on the Rules and Regulations approved by the BCE Board of Director and the processes that will execute it, the applicable supervision to the Credit Bureau should be focused on the inherent risks of the business without affecting any other external control that the Superintendent of Companies or any other Egyptian institution can carry out.

This implies that the supervision is not supported exclusively in "normative controls", but in the evaluation of the risk of the Credit Bureau based mainly on 1) its strategy risk (Business Plan); 2) its corporate government, [Reputation risk]; 3) the quality of the management of the business and the associated risk to them [Risk of Processes]; 4) technological risks; and 5) Financial Risks related to the systems of internal control focusing in the sustainability of the business.

Nevertheless, the regulation has to be established under the "prudential criterias" that will promote a better management of the business and, in this concrete case, of the Credit Bureau. Therefore, it is indispensable even in this particular Credit Bureau case (even when it principles should be for any company) the design and the emission of a normative related, 1) to the technological risk that allows the framing of the CB's management in the diminishing of this risk; and 2) that obviously has a significant impact in the quality of services offered by the Credit Bureau and that has a significant impact in the commercial decisions of the financial institutions.

Based on regulatory norms, the Central Bank of Egypt, with reports designed for such purpose, will be able to oversee the risk of the Credit Bureau, which will permit to plan field inspections with standardized procedures that are found predicted in the Manual of Inspection and to measure: 1) the quality of management of the business and its sustainability, as well as the impact that is delivered toward its clients, that is to say to guarantee that the product to deliver constitutes an information that is trusty, dependable, opportune and truthful; this, 2) at the same time will allow the reduction of the level of claims that the bureau and the Central Bank of Egypt will receive on the part of the clients of the financial system.

In other words, if we wanted to abstract a process of control and supervision toward the Credit Bureau with the purpose of identifying and mitigating the aforementioned risks, we could establish the following diagram:



Parameters for delivery and processing of information, maintaining its quality and technology standards, need to be established by CBE to mitigate credit bureau risks. Such issues affect the "credit report" and consequently the decisions made by financial institutions. Such parameters need to be established whether CBE confines its role to regulation/supervisor of the credit bureau or allows credit bureau access to its own public registry data base. This is more so because a credit bureau is considered part of the financial system, under the banking law, supervised by CBE just as banks are and information provided by it is relied upon by banks in credit granting.

As it has been previously stated, the emission of a normative, regulating 1) on technological risk is required (operating); 2) plus the management controls reinforcement under this normative (corporate government) Credit Bureau.

G. IT Standards for Successful Operation of Credit Bureau & IT Oversight

Credit Bureau Auditing Structure. A (full/part-time) CB Compliance Auditor is required

The Normative

1. Supervising on Information (Data issues)

The basic agreement between the Credit Bureau and the Central Bank is basically related to the original source of the data to be supplied, its quality, length of fields, maturities of loans, etc. It is a technical issue that should be resolved by both parties.

A complete format for sending the DATA to the Bureaus should be in place and used by CBE as a supervisory tool.

2. Supervision on Technological Issues and Risks

It has been our recommendation that the Central Bank of Egypt should corroborate the existence, from the very beginning of the project, of an integrated and interrelated system. This can be achieved through designing different computer software packages to accomplish the Credit Bureau goals, which should constitute as a whole, a strong, responsive, and trustful instrument for the collection of information and dissemination of risk information related to its consumers.

To accomplish this purpose, it should be verified that the use of sufficient and appropriate technology by the credit bureaus is in place from the beginning, to guarantee several essential functions as follows:

a) High security standards in data storage and handling of the information;

b) Strong, flexible and highly expandable systems in their response to the needs of users or affiliates;

c) High processing and dissemination speed of the data sent by their affiliates. In this sense, it is vital that the credit bureau established in the country and from the very beginning, and in a maximum of five days, could accomplish the processing and dissemination of all information transferred either from the Central Bank of Egypt or its affiliates.

d) Continuous and uninterrupted services, 24 hours a day, seven (7) days a week (24/7), throughout the year;

e) A *"mirror*" system. It means equipment and information essential to guarantee uninterrupted services, even in the event of a disaster, natural or otherwise intentionally provoked.

In order to accomplish the aforementioned issues, it should be corroborated that the establishment of the Credit Bureau complies with the operational vision of what is known in IT circles as *front office* or *back office systems*, powerful enough to work with operational strength, as well as absolutely independent of each other.

In addition, the Central Bank of Egypt should have the capacity to verify the fulfillment of the following minimum requisites demanded to the credit bureau, whether they are established under a local or an international data processing structure:

Front Office

Multiple servers should operate as a strong, fast and flexible *front office*. The *front office* should have redundancy of equipment (server's duplicity) to avoid the interruption of services in case of any natural or provoked failure.

In this sense, it is necessary to stress, as minimum capacity standards, the fact that the Credit Bureau should be able to process *one million accounts in less than twenty-four (24) hours*.

On the other hand, every server should be internally configured with redundant disk systems and energy sources, and:

a) At least 2 (two) Web servers, with two (2) internet service suppliers, independent from each other;

b) In spite of the software technology applied to data processing (SQL, Oracle, etc), the credit reporting system should be build up based on graphic design (HTML, XML/XSL technology, etc) and not merely on text characters, in order to freely allow the inclusion of pictures and any other graphics in the reports;

c) Powerful and strong redundant disks systems, or RAID disks (Redundant Array Information Disk), having not only high processing speed but also a very high data storage capacity. They should all be mutually installed with SCSI connectivity systems and high quality RAID controller cards.

The Central Bank of Egypt Computer Systems Auditor should take into account the following requirements:

- Hard disk minimum capacity of approximately 1 terabyte, with update RAID redundancy technology.

- Updated and very high speed -sate of the art- CPU processors. Verify that the capacity of RAM memory is large enough to support a very strong operating load.

- To corroborate that a minimum processing capacity of 1 (one) million accounts in less of twenty-four (24) hours is in due place.

- To check that final credit reports programming languages, are assembled in order to support the inclusion of graphs, pictures, etc.

- To confirm the existence of at least two (2) Web servers supplying services to the Credit Bureaus absolutely independent from each other and with large capacity of disks, processing speed and RAM memory.

- To review the different hardware devices technical guidebooks.

Back Office

The *back office* hardware and technological capacity should be very similar to the *front office*. In this sense, the *front office* could be offering services to the affiliates or making credit reports while the *back office* is simultaneously processing data or updating information, without affecting or reducing the processing speed carried out by the *front office*.

The Credit Bureau should have the capacity of processing and publishing an online credit report in one second or less.

The information processing systems should be the most precise and accurate in the identification methodology through names, ID's, addresses or telephones, in addition to sophisticated phonetic identification procedures, in order to render a service to the affiliates with zero margin of error.

The *back office* should carry out this operation in order to identify precisely and accurate with a unique frequency sequence *who* is the candidate that is evaluated.

The Central Bank of Egypt Computer Systems Auditor should take into account the following requirements:

- To ensure that the back office servers are provided with disks, processing speed and RAM memory of strong and large capacity, similar to the front office. To review the different hardware devices technical guidebooks.

- To confirm through field tests that credit report processing and online publication capacity is one second or less.

- To verify that the internal data search algorithms, in conjunction with the test information, determine search data times and data search possibilities according to the standards. Consequently, random tests will be carried out.

- To confirm the data search capacity through phonetics capabilities, via random tests.

Installed Electrical Capacities:

The electric system for the operations center and for the data processing center should have operational redundancy equipment such as external electric generators and *UPS* (*Uninterrupted Power Supply).*

It will be ensured that the redundancy equipments has an installed capacity of at least 40 per cent above the data processing center nominal requirements. In addition to the redundancy and regarding the electric energy supply, it will be confirmed that all information system equipments (servers, among others) have internally redundant "*power supply*" sources.

The Central Bank of Egypt Computer Systems Auditor should take into account the following requirements:

- To confirm the existence of enough KW's of energy in the UPS, in addition to the capacity of the eternal electric generator to bear and exceed in a 40% the computing center overall electric load
- To ensure that the critical mission equipment (servers, etc.) includes independent UPS
- To review the UPS technical guidebooks

Information Security:

It is necessary to verify not only the presence and use of the most modern, updated, state-of-the-art, and complete firewall equipment on the market, but also the updating of information security processes in order to constantly avoid and protect external attempts to corrupt the stored data or to interrupt the service, from denials of service attacks or hackers.

It should be verified that the existence of a strict internal control of the information manipulation within the Credit Bureau, either by their own staff or others, as well as the restricted access to Internet, e-mails, use of floppy disk drive units or *CDRW's*.

The Central Bank of Egypt Computer Systems Auditor should take into account the following requirements:

- To be sure that the network architecture is absolutely secured with the latest firewall technology
- To check the computing center location. To assess the computing center minimum physical securities, such as: restricted entry and the use of security devices, humidity and temperature control, smoke and fire detectors, updated fire control methods, double flooring, etc.
- To analyze the implemented security measures for restricted access to physical devices such as: Internet, e-mails, floppy disk drive units, CDRW's, or anything through which sensitive information could be obtained.
- To check the logical security offered by the software Including user IDs, passwords, time-out periods, and auditing clues either about users or operations carried out within the software.

Information conversion systems or "*Mapping*":

It has to be duly analyzed that the installed processing capacities of handling the data structures sent by affiliates and the abilities to transfer them into the Credit Bureau's internal data structure. This is to ensure those conversion systems allow the processing of multiple formats coming from the affiliates' different information systems.

The Credit Bureau should provide affiliates with the necessary structures and "fieldwidths", allowing the highest versatility in the information processing and dissemination.

The Central Bank of Egypt Computer Systems Auditor should take into account the following requirements:

- To assess the capacity of processing the different data structures sent by the affiliates and to transform them in the structure managed by the bureau.

- To determine the technological platform regarding the database to be utilized. To review the data base guidebooks. To examine policies and procedures of data conversion.

Storage Capacity:

This will depend on the internal design for databases processing.

Due to the fact that the Credit Bureaus will have to manage the historical records of the country's financial system from some previous years back, the installed capacity devoted to accomplish this goal should have enough storage *gigabytes* or *terabytes*, at least for storing the first three (3) years of future operations. High storage capacity and the high speed of *SCSI* disks should also be confirmed.

The Central Bank of Egypt Computer Systems Auditor should take into account the following requirements:

- To assess the hard disks minimum capacity as approximately 1 terabyte, with the latest technology RAID redundancy and high speed disks.

Response Capacity:

The Central Bank of Egypt Computer Systems Auditor should confirm that the credit Bureau load-bearing capacity is of at least 20,000 users connected to the system. Similarly, to verify the capacity to respond efficiently and quickly to a minimum of 600 users connected simultaneously and demanding a credit report.

The Central Bank of Egypt Computer Systems Auditor should take into account the following requirements:

- To carry out field tests to prove the system capacity to bear at least 20,000 users and 600 simultaneously connected users demanding a credit report.

Communications Requirements:

A minimum of two (2) web servers, connected and providing services through two (2) independent Internet service providers is required. It should also be verified that they are interconnected with the fastest, most powerful, and efficient communications and telephone enterprises which could offer its services to the Credit Bureau.

At the same time, it should be confirmed the provision via *RAS modems* (*Random Access Service*), to the affiliates lacking Internet services.

If it is the case that the Credit Bureau service is rendered trough a data processing center external (trans-boundary) to the country, it will be verified that the firm has additional local servers, not only to be able to create a *VPN (Virtual Private Network)*, but also to offer a "point to point" type of connectivity through local *routers* and via *frame relays.*

Mechanisms to access and to obtain credit reports:

It will be verified that the multiple bureaus are ready to operate:

- Via *Internet*;
- Via *modem;* ("Client-server" Technology or *Intranet - browser*)
- Via *frame relay*; and
- Other means, such as: fax, messaging or electronic batch sets. (Pre-digitalized batches requests delivered to the credit bureau in the form of diskette, zip, magnetic tapes, among others)

The Central Bank of Egypt Computer Auditor should take the following into consideration:

- To verify the bandwidth to be used, the data transmission speed and the physical devices used in the networks. Fiber optic connectivity in the "last mile" is a plus.
- To make sure web servers offer services through independent Internet providers. To verify which enterprises will provide this service to the CB
- To assess the possibility of rendering services via modems through RAS (Random Access Service)
- If the Credit Bureau service has external data processing, the existence of a local server able to create a VPN (Virtual Private Network) and to offer point-to-point connectivity through devices such as routers and frame relays should be verified
- To ensure the possibility to access and obtain credit reports through Internet, modems, frame relay (point-to-point) and others
- To review the hardware devices technical guidebooks used

H. Code of Ethics for Credit Bureau

From the very beginning, a Code of Ethics and Non-Disclosure of Information should be singed by all Boards Members and high level staff, prohibiting the selling, giving, supplying or retracting of any kind of information (especially Universal Data) from the Credit Bureau for their own use or for the institutions they represent.

A code of conduct between the Board of Directors or any of its member regarding their involvement and independency from the administration of the Credit Bureau should be established. Rules on board members' independence from users and management, qualification standards, responsibilities, access to management, and, as necessary and appropriate, independent advisors. Regulations should be issued in terms of corporate governance for any and all credit bureaus in Egypt. The majority of board membership should be independent from user/owner groups. A clear definition of duties and responsibilities, particularly in terms of oversight by an audit committee, both in terms of financial audits, but more importantly in terms of systems audits, should be laid out.

From the very beginning, it should be verified that all manuals for procedures, operations and rules, employee manuals, and code of ethics and others, are in proper place and available to everybody within the companies.

By the time a Credit Bureau commences business, it should have a Specialized Service Department for 1) Walk in costumers, 2) financial institutions, 3) Insurance Companies, and 4) non-financial costumers:

- That have a manager's office to offer such services;
- That have an end-user training plan and an users manual;
- That is able to monitor users in order to timely correct any deficiency.

Central Bank of Egypt Inspectors should:

- confirm if the Sales Department have, at national level, a sales plan covering the whole Egyptian territory
- determine if the Client Service Department has structured mechanisms for offering advices and reviewing requests introduced by the consumers and according to the Rules and Regulations from CBE
- determine if the Information Collection Department has a structured plan with sufficiently trained staff able to search for and collect monthly information from all its members, including Legal and Judicial information
- verify, during the course of a physical inspection to the institution, the existence of an adequate physical infrastructure, as well as enough physical space for the managerial and administrative offices

In case the physical infrastructure is not owned by the Credit Bureau, verify through the leasing contract what kind of available physical infrastructure (for administrative and client service offices) is provided in order to offer excellent service to users and affiliates. This includes information collection and services provided to the system end-users or general public, both in Cairo, and the main Egyptian cities.

I. Ensuring Financial Strength of Credit Bureau

According to the standards under the Egyptian laws and by the ways and means of the CBE, as they perform with regulated financial institutions, a continuous diagnostics and monitoring ratios on financial soundness of the credit Bureau should in its proper place.

J. The Compliance of CBE's Rules and Regulations regarding costumer's protections, services and complaints

It should be verified that all principles and procedures according to the rules and regulations, are in proper place within the CB, and that manuals and booklets for internal use and consumer's knowledge are established from the beginning and always available in the credit bureaus.

A Final Note: For the majority of the issues related to supervising the Credit Bureau's Operations, the most efficiency system is to create a checklist that will be used, on a very standardized form by the BCE's auditors.

K. CBE IT Capacity as an Information Provider:

Based on our findings and dialogues with CBE IT Officers, at the present time the CBE does have the capacity to isolate raw data, process or store the full data from the banking system, even under the presumption that this data will be forward to the CBE with/without the Data Structures Formats of credit bureaus.

All account information from L.E.0.00 to L.E. 30,000 may be reported to the credit bureaus directly from the banks on a monthly basis. If CBE has the systems capacity to either isolate this raw data, process or store this amount of information, other potential methods to transfer the data to the Credit Bureau should be analyzed (meaning from Banks to CBE and from CBE [raw] to the Credit Bureaus).

It is far beyond the reach of the present scope of work to establish the actual capacity of IT and Storage Systems of the CBE, and/or upgrade the software or hardware in their actual systems (if necessary), that will be required to accomplish this mission and present these findings in the form of a complete technical report.

Note: A strong public credit registry (PCR) is a valuable asset in the credit information system of any modern market economy. Among other benefits, an enhanced PCR is a valuable tool in promoting competition in credit reporting and for improving oversight of the performance of private bureaus.

In several countries, including Ecuador in Latin America, data from the PCR is provided to private credit reporting firms in order to develop a strong core of financial data for the credit reporting industry. A well-functioning PCR is also a benchmark for the performance of private credit bureaus to be compared, for instance, reviewing the quality and completeness of data at least from the regulated financial sector. Furthermore, the information that public and private credit bureaus store in their databases can be regarded as "reputation collateral", which should be protected given its relevance.

The existence of a PCR helps to ensure that this reputation collateral always be available. The PCR policies, however, should seek to promote competition in this industry not to replace or provide unfair competition to private sector initiatives.

It is our final recommendation that CBE authorities carefully review their PCR and evaluate the possibility of upgrading to the systems in order to perform the aforementioned task.

L. Estimates of Credit Bureau Investment Cost

a) Processing outside the Boundaries of Egypt. We understand that this is not the Egyptian case, but in the case that a credit bureau is established in Egypt with external,/out of Boundaries processing the initial investments in proceeding and VPN Systems, communications systems are very low. All figures are in US$

Processing systems, communications systems and PC´s	$300,000

b) Local Credit Bureau in technical partnership with an external Credit Bureau All figures are in US$

1) Hardware (Includes communications systems)	$ 600,000 - 800, 000
2) Local Software Development (staffing, time)	Unknown
3) External Software Acquisition and/or Licensing Costs)	$300,000 – 1,000,000
4) Know How Transferring	Unknown
5) Local Management Costs - per/year	$ 400,000 - 600,000
6) Foreign management and fees	$ 600,000 – 1,000,000

7) Fixed Costs (Staff, Comms, and others) $1,000,000 – 2,000,000

M. Additional Recommendations

Based on our latest findings and discussions with Central Bank Officers and ESTELEAM, we suggest the following steps:

1- EFS should assist CBE in drafting detailed norms regarding Licensing and Supervision of the credit bureaus that will be operating in Egypt
2- This Normative should be composed with all the key issues discussed in this documents such as Management, Business Plan or Technology Assessment
3- EFS should continue to serve as a “linking” structure between CBE and ESTELEAM, as many important and crucial issues will arise in the process of selecting, approving and implementing a new Credit Bureau for Egypt

II. ADDENDUM

Annex 1 - Questionnaire #1

General Quick Assessment

General Information_____
Name_____
Company_____
Title_____
Department_____
Phone #_____
Address_____
Email_____

1. Which of these products and services does your institution offer and please specify approximate number of customers per product?

Product Name _____ **Approx. Number of Customers**_____

[ ] Unsecured Term Loans (salary-based lending) _____
[ ] Mortgage Loans _____
[ ] Credit Cards (secured)/ Store Cards _____
[ ] Credit Cards (unsecured)/ Store Cards _____
[ ] Transaction Accounts / Overdrafts _____
[ ] Commercial Loans (focused on small and medium-sized enterprise) _____
[ ] Asset / Operation Leases _____
[ ] Individual or Solidaire Credits _____
[ ] Telecommunication (mobile) _____
[ ] Commercial Credit _____

2. Have you implemented any In-house credit scoring technology? YES [ ] NO [ ]

Annex 2 - Questionnaire #2

Product Assessment

General Information_____
Name_____
Company_____
Title_____
Department_____
Phone #_____
Address_____
Email_____

Select One of these Products Per Form:

[ ] Unsecured Term Loans (salary-based lending)
[ ] Mortgage Loans
[ ] Credit Cards/ Store Cards (secured)
[ ] Credit Cards/ Store Cards (unsecured)
[ ] Transaction Accounts/ Overdrafts
[ ] Commercial Loans (focused on small and medium-sized enterprise)
[ ] Asset/ Operation Leases
[ ] Individual or Solidaire Credits
[ ] Telecommunication (mobile)
[ ] Commercial Credit

General Product Question

1. Do you manage this product using a computerized-automated system? Yes ( ) No ( )
2. Approximately how many records do you have? _____
3. Approximately how many open-active accounts do you have? _____
4. Approximately how many new accounts do you open per month? _____
5. Approximately how many accounts do you close per month? _____
6. Approximately how many accounts are 30 days overdue? _____
7. Approximately how many accounts monthly are passed to collection? _____
8. Approximately how many overdue accounts do you have per month? _____
9. Approximately how many collection accounts turn into right-off accounts? _____

Data Analysis Assessment Questions

Managing Client Behavior and Credit History

1. Do you have Customer Relationship Management (CRM) Solution? Yes ( ) No ( )

2. Do you have a status field for each client? Yes ( ) No ( )

3. Do you have another status field for the account related to the client? Yes ( ) No ( )

4. Can you provide us a complete list of status codes and descriptions? Yes ( ) No ( )

5. Please specify the minimum number of days considered as an overdue account status?

[ ] 15 Days [ ] 30 Days [ ] 45 Days [ ] 60 Days

6. Do you categorize your clients based on their credit history? Yes ( ) No ( )

7. How long do you keep your credit history data?
1Year ( ) 2 Year ( ) 3 Years ( ) More than 3 Years ( )

8. When your clients are penalized for bad credit behavior, for how long they must be kept penalized after they solve their financial situation?

9. Did you have any problems related to client's accounts status in the past? Yes ( ) No ( )

10. Is it possible to find the following situations in your information system?
[10.1] An account related to a wrong client? Yes ( ) No ( )
[10.2] A status that doesn't correspond to an account Yes ( ) No ( )
[10.3] A payment or credit issue that is not applicable to a client Yes ( ) No ( )
[10.4] A personal identification that is not well saved in your Database Yes ( ) No ( )

11. Do you manage any Black List? Yes ( ) No ( )

12. Do you close out your accounts? Yes ( ) No ( )

13. Do you keep track of the close accounts? Yes ( ) No ( )

14. How long do you keep the records of the closed accounts?
1Year ( ) 2 Years ( ) 3 Years ( ) More than 3 Years ( )

15. Do you purge the closed accounts records? Yes ( ) No ( )

16. "Do you keep the historical debts, payments, behavior of close accounts?" Yes ( ) No ( )

17. For how long would you keep the closed accounts in the CBE?
1Year ( ) 2 Years ( ) 3 Years ( ) More than 3 Years ( )

Database Questions

1. Which Database are you using?
SQL Server 7 or Inferior ( ) SQL Server 2000 ( ) ORACLE 8i or Inferior ( )
ORCLE 9i ( ) Sybase ( ) Interbase ( ) DB2( ) Other ( ) _____

2. Is the information stored in a relational database structure? Yes ( ) No ( )

3. How many tables your database has? _____

4. How many critical tables your database has? _____

5. How often do you update your data?
Daily ( ) Weekly ( ) Monthly ( ) Other ( ) _____

6. Do you keep a history log of the updated records? Yes ( ) No ( )

7. Can you extract only the update records from your database? Yes ( ) No ( )

8. Do you have a database administrator? Yes ( ) No ( )

Software Specification

Please specify the following product software information.

1. Your product vendor name _____

2. In which computer programming language has this software been developed?
C++ ( ) COBOL ( ) RPG ( ) Visual Basic ( )
Delphi ( ) Unknown ( ) Other ( ) _____

3. In which of these following Platforms this program runs?
Windows ( ) Mainframe ( ) Unix ( ) Linux ( ) Other ( )_____

4. Is it a proprietary program? Yes ( ) No ( )

Hardware Specification

Please specify information about the hardware used for your primary Database or Storage Server:

1. Memory Size _____ (MB)

2. Number of Processor 1 ( ) 2 ( ) 4 ( ) 8 ( ) more than 8 ( )

3. Manufacturer _____

4. Model _____

5. Storage Capacity (All Hard Drives) _____(GB)

6. Does this Server have a Hard Drive Fail-Over (RAID)? Yes ( ) No ( )

7. Does this Server has power supply Fail-Over? Yes ( ) No ( )

8. Is this Server connected to a UPS (Uninterrupted Power Supply) Yes ( ) No ( )

9. Do you have a backup server or cluster servers? Yes ( ) No ( )

Operating System

1. Which Operating system do you use?
Windows ( ) Unix ( )OS2 Linux ( ) OS400 ( ) Mainframe ( )
Other ( ) _____

2. Specify the Operating System version number you use _____

3. Do you have an administrator for your Operating System? Yes ( ) No ( )

4. Do you have the TCP/IP Protocol configured in your Operating System? Yes ( ) No ( )

5. Which Other Network Protocol do you use?
NetBios [ ] IPX/SPX [ ] Other ( ) _____

Annex 3 - Questionnaire #3

Product data fields assessment

General Information_____
Name_____
Company_____
Title_____
Department_____
Phone #_____
Address_____
Email_____

1. Please select only one product for this form

Product Name		Approx. Number of Customers
[ ]	Unsecured Term Loans (salary-based lending)	_____
[ ]	Mortgage Loans	_____
[ ]	Credit Cards / Store Cards	_____
[ ]	Transaction Accounts / Overdrafts	_____
[ ]	Commercial Loans (focused on small and medium-sized enterprise)	_____
[ ]	Asset / Operation Leases	_____
[ ]	Individual or Solidaire Credits	_____
[ ]	Telecommunication (mobile)	_____
[ ]	Commercial Credit	_____

Please Specify if your system has any of the following fields for the above selected product:

Check	Ref	Fields	Description
	1	Entity Type (Person or Business)	P=Person, B=Business
	2	Customer Identification File number	Example CIF Number
	3	Date Became Client	
	4	**Person's Full Name**	**If Entity Type is a Person**
	5	Person's Date of Birth	YYYYMMDD Format
	6	Person's City of Birth	
	7	Person's Country of Birth	
	8	Person's Old ID	
	9	**Person's New ID**	
	10	Person's Gender	F=Feminine, M=Masculine
	11	Person's Official Business Registry ID number	
	12	Person's Passport Number	
	13	Person's Nationality	
	14	Person's Marital Status	For example: S=Single, M=Married, etc.
	15	Person's Number of Dependents	
	16	Person's Spouse Name	
	17	Person's Spouse ID	
	18	Person's Home phone number	
	19	Person's Work phone number	
	20	Person's Mobile phone number	
	21	Person's Pager number	
	22	Person's Fax number	

23	Person's Electronic Address (E-mail)	Debtor E-mail
24	Person's Address	(Street name, House number)
25	Person's Address	(Neighborhood, Sector)
26	Person's City	City or Municipality
27	Person's Occupation	
28	Employer Name	
29	Employer Address	
30	Employer Phone number	
31	Employer E-mail	
32	Employer Department	
33	Occupation	
34	Date Hired	YYYYMMDD Format
35	Date Terminated	YYYYMMDD Format
36	Monthly Salary amount	
37	**Business Name**	**If Entity Type is a Business**
38	Business Acronym	
39	**Official Business Registry ID number**	
40	Business Address	(Street name, House number)
41	Business Address	(Neighborhood, Sector)
42	Business City	City or Municipality
43	Business Electronic Address (E-mail)	
44	Business Phone number	
45	Business Fax number	
46	Account number	Must be unique for each client.
47	Currency Code	Egyptians Pounds, US$
48	Credit (or debit) Interest Rate	
49	Account or Loan type	(Credit Card, Mortgage Loan, Personal Loan, etc.)
50	Type of Relationship with the Account	Responsibility of the Person or Business with this credit
51	Account's Official Credit Rating Code	Credit Rating Code assigned by the Central Bank's policies
52	Account Status Code	Code Assigned to Account to describe payment behavior. Example: (N, M, L)
53	Account Status Description	Indicates the Account Status According to Payment History (Example N=Normal, D=Delinquent, C=Collection, CH=Charge Off)
54	VIP Treatment Code	Code to specify this client as a Privileged Customer (must not reflect overdue status)
55	Guaranty (or collateral) Type	
56	Date Reported	YYYYMMDD Format (Date this data is valid on)
57	Date Account Opened	YYYYMMDD Format
58	Account Expiration Date	YYYYMMDD Format
59	Effectively Date	YYYYMMDD Format
60	Cancellation Date	YYYYMMDD Format
61	Last Activity Date	YYYYMMDD Format
62	Date of Last Payment	YYYYMMDD Format
63	Credit Limit/Original Loan Amount	
64	Balance Amount	The balance of the account as of the date in the Date Reported field

	65	Last Payment Amount	
	66	Installment Amount	Payment Fixed Amount
	67	Total Amount Overdue	Total Amount Overdue
	68	Minimum Payment/Loan Payment	Example: Credit Card required minimum payment amount
	69	Term of the Loan	Installments agreed upon for total payment
	70	Payment Frequency	
	71	Number of Installments Overdue	
	72	Highest Credit Amount Utilized	
	73	Amount Overdue 1-30 Days	Overdue amount in the indicated interval
	74	Amount Overdue 31-60 Days	Overdue amount in the indicated interval
	75	Amount Overdue 61-90 Days	Overdue amount in the indicated interval
	76	Amount Overdue 91-120 Days	Overdue amount in the indicated interval
	77	Amount Overdue 121-150 Days	Overdue amount in the indicated interval
	78	Amount Overdue 151-180 Days	Overdue amount in the indicated interval
	79	Amount Overdue 181 Days or More	Overdue amount in the indicated interval
	80	Collection Amount	
	81	Write-off Amount	
	82	Commentaries	

Annex 4 - Questionnaire # 4

General Technical and Business Assessment

General Information _____
Name _____
Company _____
Title _____
Department _____
Phone # _____
Address_____
Email_____

1. Do you have a standard centralized repository for your data bank solutions? Yes ( ) No ( )

2. XML Questions

1. Do you know how to use xml for data retrieve and exchange? Yes ( ) No ( )
2. Do you have the technical skills capabilities to read and write the xml files from your data deposit storage?
   Yes ( ) No ( )
3. Have you implemented or used web services in your IT infrastructure?
   Yes ( ) No ( )
4. Do you have the technical skills capabilities to create web services?
   Yes ( ) No ( )
5. Do you have the technical skills capabilities to use web services from your company infrastructure space?
   Yes ( ) No ( )

3. Encryption Questions

1. Do you keep Encrypted Data on your Database System? Yes ( ) No ( )
2. Which Encryption Software do you use? _____
3. Which Encryption method do you use? _____
4. Do you have capability to deliver Encrypted Data? Yes ( ) No ( )

4. Network Infrastructure

1. Do you have domain for the network? Yes ( ) No ( )
2. How many domains do you have? _____
3. How many users normally connect to your network? _____
4. How many servers do you have? _____
5. Do you have remote user connected? Yes ( ) No ( )
6. How many branches do you have? _____

7. Are these branches interconnected? Yes ( ) No ( )
8. Specify type of connection between Branches
   [ ] Frame Relay
   [ ] ADSL
   [ ] VPN
   [ ] Dialup
   [ ] Dedicated Line
   [ ] Other _____

9. Please specify Minimum connection speed and Maximum Connection speed.
   Minimum speed _____ Maximum speed _____

10. Which Operating System do your employees commonly use?
    Windows ( ) Unix ( ) Linux ( ) Terminal Client ( )

11. Which is your default browser?
    Internet Explorer ( ) Mozilla Firefox ( ) Opera ( ) Netscape ( )
    Other ( ) _____

12. Do you have CORBA Support? Yes ( ) No ( )

13. Have you used CORBA? Yes ( ) No ( )

14. What did you use CORBA for? _____

15. Do you know how to use CORBA? Yes ( ) No ( )

16. Do you have a Web Server? Yes ( ) No ( )

17. Which Web Server do you use?
    IIS ( ) Apache ( ) Websphere ( ) Other ( ) _____

18. Is it a private or public Web Server?
    Private ( ) Public ( )

19. Do you have this Web Server in your own Network or outside your domain and location?
    Own network ( ) Outsource Provider ( )

20. Do you have a web server administrator? Yes ( ) No ( )

21. Do you use SSL/TLS or any Secure Layer for authentication of client connected to the Internet? Yes ( ) No ( )

22. Do use Digital Certificates? Yes ( ) No ( )

23. Are you the issuer of the certificates? Yes ( ) No ( )

Annex 5 – Checklist Prepared for Oversight of IT

1. Issues related to Operational and Communications Requirements

a) Is in place from the starting point of operations the existence of an integrated and interrelated system through several computer software designed to accomplish the Credit Bureau goals, which should constitute as a whole, a strong, responsive and trustful instrument for the collection of information and dissemination of risk information related to its consumers?

b) High security standards in data storage and handling of the information?

c) Strong, flexible and highly expandable systems in their response to the needs of users or affiliates?

d) High processing and dissemination speed of the data sent by their affiliates?

e) The processing and dissemination of all the information transferred either from Commercial Banks or the Central Bank of Egypt are less than a maximum of five days? 48 hours is the ideal maximum.

f) Continuous and uninterrupted services, 24 hours a day, seven (7) days a week (24/7), throughout the year?

g) Does the company have established already a "*mirror*" system? Have equipments and information redundancy, outside of the main data processing center building to guarantee uninterrupted services, even in the event of a disaster, natural or otherwise intentionally provoked been established?

In order to accomplish the aforementioned issues, it should be corroborated that the establishment of the Credit Bureau complies with the operational vision of what is known in IT circles as *front office* or *back office systems*, powerful enough to work with operational strength, and independency from each other.

In addition, the Central Bank of Egypt should have the capacity to verify the fulfillment of the following minimum requisites demanded to the credit bureau, either if they are established under a local or an international data processing structure

2. Front Office

Multiple servers should operate as a strong, fast and flexible *front office*. The *front office* should have redundancy of equipment (server's duplicity) to avoid the interruption of services in case of any natural or provoked failure.

a) It is necessary to stress, as minimum capacity standards, the fact that the Credit Bureau should be able to process *1 million accounts in less than 24 hours*…. Is this capacity at hand from start?

b) Are all server internally configured with redundant disk systems and energy sources?

c) Are there at least 2 (two) Web servers, with two (2) Internet service suppliers, independent from each other?

d) In spite of the software technology applied to data processing (SQL, Oracle, etc), the credit reporting system should be build based on graphic design (HTML, XML/XSL technology, etc) and not merely on text characters, in order to freely allow the inclusion of pictures and any other graphics in the reports. Is this requirement in proper order?

e) Are there powerful and strong redundant disks systems, or RAID disks (Redundant Array Information Disk), having not only high processing speed but also a very high data storage capacity? Are they all mutually installed with SCSI connectivity systems and high quality RAID controller cards?

f) The Central Bank of Egypt Computer Systems Auditor should take into account the following requirements:

- Hard disk minimum capacity of approximately 1 terabyte, with update RAID redundancy technology._____

- Updated and very high speed state-of-the-art CPU processors. Verify that the capacity of RAM memory is large enough to support a very strong operating load._____

- To corroborate that a minimum processing capacity of 1 (one) million accounts in less of twenty-four (24) hours is in due place._____

- To check that final credit reports programming languages, are assembled in order to support the inclusion of graphs, pictures, etc._____

- To confirm the existence of at least two (2) Web servers supplying services to the Credit Bureaus absolutely independent from each other and with large capacity of disks, processing speed and RAM memory. _____

- To review the different hardware devices technical guidebooks. _____

3. Back Office

The *back office* hardware and technological capacity should be very similar to the *front office*. In this sense, the *front office* could be offering services to the affiliates or making credit reports, while the *back office* is simultaneously processing data or updating information, without affecting or reducing the processing speed carried out by the *front office*.

a) The Credit Bureau should have the capacity of processing and publishing an online credit report in one second or less.

b) The information processing systems should be the most precise and accurate in the identification methodology through names, ID's, addresses or telephones, in addition to sophisticated phonetic identification procedures, in order to render a service to the affiliates with zero margin of error.

c) The *back office* should carry out this operation in order to identify precisely and accurate with a unique frequency sequence who is the candidate that is evaluated.

d) The Central Bank of Egypt Computer Systems Auditor should take into account the following requirements:

- To ensure that the *back office* servers are provided with disks, processing speed and RAM memory of strong and large capacity, similar to the *front office*. To review the different hardware devices technical guidebooks.

- To confirm through field tests that a credit report processing and online publication capacity of one second or less.

- To verify that the internal data search algorithms, in conjunction with the test information, determine search data times and data search possibilities according to the standards. Consequently, random tests will be carried out.

- To confirm the data search capacity through phonetics capabilities, via random tests. The development of an Arabic phonetics identification system is a must.

4. Other Important Requisites

It will be verified that the Credit Bureau is capable to fulfilling the following:

a) Installed Electrical Capacities

1) The electric system either for the operations center or for data processing center should have operational redundancy equipments, such as external electric generators and *UPS* (*Uninterrupted Power Supply).*_____

2) It will be confirmed that the redundancy equipments has an installed capacity of at least forty (40) per cent above the data processing center nominal requirements. _____

3) In addition to the redundancy and regarding the electric energy supply, it will be confirmed that all information system equipments (servers, among others) have internally redundant "*power supply*" sources._____

4) The Central Bank of Egypt Computer Systems Auditor should take into account the following requirements:

- To confirm the existence of enough KW's of energy in the UPS, in addition to the capacity of the eternal electric generator, to bear and exceed in a 40% the computing center overall electric load._____

- To verify that the critical mission equipment (servers, etc.) includes independent UPS._____

- To review the UPS technical guidebooks._____

b. Information security

1) It is necessary to verify not only the presence and use the most modern, updated, state-of-the-art and complete firewall equipment on the market, but also to update the information security processes in order to constantly avoid and protect external attempts to corrupt the stored data or to interrupt the service. In other words, full protection against *denials of service attacks or hackers*).

2) It should be verified that the existence of a strict internal control of the information manipulation within the Credit Bureau, either by their own staff or others, as well as the restricted access to Internet, e-mails, use of floppy disk drive units or *CDRW's*

3) The Central Bank of Egypt Computer Systems Auditor should take into account the following requirements:

   - To be sure that the network architecture is absolutely secured, it should have the latest firewall technology.

   - To check the computing center location. To assess the computing center minimum physical securities, such as: restricted entry and the use of security devices, humidity and temperature control, smoke and fire detectors, updated fire control methods, double flooring, etc.

   - To analyze the implemented security measures for restricted access to physical devices such as: Internet, e-mails, floppy disk drive units, CDRW's, etc, through which sensitive information could be obtained.

   - To check the logical security offered by the software. User ID, passwords, time out period, auditing clues, either about users or operations carried out within the software.

c) Information conversion systems or "*Mapping*":

1) It has to be duly analyzed if the installed processing capacities of handling the data structures sent by affiliates, and the abilities to transfer them into the Credit Bureau's internal data structure. Does the Credit Bureau claims that all data should be standardize before it could be process in the data processing center?

   CBE must be assured that those conversion systems allow the processing of multiple formats coming from the affiliate's different information systems.

2) The Credit Bureau should provide affiliates with the necessary structures and "fieldwidths", allowing the highest versatility in the information processing and dissemination.

3) The Central Bank of Egypt Computer Systems Auditor should take into account the following requirements:

- To assess the capacity of processing the different data structures sent by the affiliates and to transform them in the structure managed by the bureau. _____

- To determine the technological platform regarding the database to be utilized. To review the data base guidebooks. To examine policies and procedures of data conversion._____

d) Storage capacity:

It's important to understand that this procedure will depend on the internal design for databases processing but:

1) Due to the fact that the Credit Bureaus will have to manage the historical records of the country's financial system from some previous years back, the installed capacity devoted to accomplish this goal should have enough storage *gigabytes* or *terabytes*, to store for at least the first three years of operation. Also, it should be confirmed the high storage capacity and the high speed of *SCSI* disks.

2) The Central Bank of Egypt Computer Systems Auditor should take into account the following requirements:

   - To assess the hard disks minimum capacity of not less than 1 terabyte, with the latest technology RAID redundancy and high speed disks._____

e) Response capacity:

The Central Bank of Egypt Computer Systems Auditor should confirm that the credit Bureau load-bearing capacity is of at least 20,000 users connected to the system. Similarly, to verify the capacity to respond efficiently and quickly to a minimum of 600 users connected simultaneously and demanding a credit report.

Comments on this capacity_____

The Central Bank of Egypt Computer Systems Auditor should take into account the following requirements:

- To carry out field tests to prove the system capacity to bear at least 20,000 users and 600 simultaneously connected users and demanding a credit report. _____

f) Communications Requirements:

1) Should be ensured the presence of a minimum of two (2) web servers, connected and providing services through two (2) independent Internet service providers. It should also be verify that they are interconnected with the fastest and more powerful and efficient communications and telephone enterprises, with the highest bandwidth or internet speeds, which could offer its services to the Credit Bureau.

   At the same time it should be confirmed the provision via *RAS modems* (*Random Access Service*), to the affiliates lacking Internet services.

2) If it is the case that the Credit Bureau service is rendered through a data processing center external (trans-boundary) to the country, it will be verified that the firm has additional local servers, not only to be able to create a *VPN (Virtual Private Network)*, but also to offer a "point to point" type of connectivity through local *routers* and via *frame relays.*_____

g) Mechanisms to access and to obtain credit reports:

1) It will be verified that the multiple bureaus are ready to operate:

- Via *Internet*; _____
- Via *modem;* ("Client-server" Technology or *Intranet - browser*)_____
- Via *frame relay*; and,_____
- Other means, such as: fax, messaging or electronic batch sets. (Pre-digitalized batches requests delivered to the credit bureau in the form of diskette, zip, magnetic tapes, among others)_____

2) The Central Bank of Egypt Computer Auditor should take the following into consideration:

- To corroborate the bandwidth to be used, the data transmission speed and the physical devices used in the networks. Fiber optic connectivity in the "last mile" is a plus.
- To make sure web servers offer services through independent Internet providers. To verify which enterprises will provide this service to the CB.
- To assess the possibility of rendering services via modems through RAS (Random Access Service).
- If the Credit Bureau service has external data processing, the existence of a local server able to create a VPN (Virtual Private Network) and to offer point-to-point connectivity through devices such as routers and frame relays should be verified.
- To verify the possibility of accessing and obtaining credit reports through: Internet, modems, frame relay (point-to-point) and others.
- To review the hardware devices technical guidebooks being used.

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